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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/508,858	09/24/2004	Masatoshi Hotta	Q69368	8566

23373 7590 07/24/2007

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EXAMINER	
MERKLING, MATTHEW J	

ART UNIT	PAPER NUMBER
1764	

MAIL DATE	DELIVERY MODE
07/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/508,858	HOTTA ET AL.	
	Examiner	Art Unit	
	Matthew J. Merkling	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☒ Claim(s) *1-11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/24/04 and 2/11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitations "the other end part" in line 4, "the process" in line 10, "the inner tube" in line 11 and "the outer tube" in line 11. There is insufficient antecedent basis for these limitations in the claim.

Claim 3 recites the limitation "the ceiling part" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 5 recites the limitation "the fins" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitations "the inner tube" in line 2, "the outer tube" in line 3, "the gas" in line 5, "the temperature difference" in line 8, and "the gas flow direction" in line 8. There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 6, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Christensen (US 3,041,151).

Regarding claims 1, 2 and 6, Christensen discloses a reaction apparatus comprising a heat exchanger (shell (6), tubes (21)) and a reactor (catalyst bed, (11)) with a heater (electric heater, (7), col. 4 lines 24-26)), which are enclosed in an outer casing (shell (1)), the top of the heat exchanger (6, 21) being connected to the reactor (11), the other end part of the heat exchanger (6, 21) and the bottom of the outer casing 6 being fixed to each other by a flange (cap, (45) see Fig. 2), and a double piping (see Fig. 2) for introducing a gas to be treated through the inner pipe (49) and discharging the treated gas through the annular space, or outer pipe (see Fig. 2), such that the gas passes through the heat

exchanger (6,21), the reactor (11) and the heat exchanger (6,21) in this order during the process (see gas flow directions in Fig. 2).

Regarding claims 9 and 10, Christensen discloses a method comprising passing a gas to be treated sequentially into an inner tube (49) in a double piping (see Fig. 2), a heat exchanger (shell (6), tubes (21)), a reactor (11) with a heater (7), the heat exchanger and the outer tube (51) in the double piping in this order and heating the gas to be treated by the heater before the gas to be treated is introduced into the reactor (col. 4 lines 19-29), thereby adjusting the temperature difference in the gas flow direction inside the reactor.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) as applied to claim 1 above, and further in view of Keto et al. (US 3,732,517).

Regarding claim 3, Christensen, as discussed in claim 1 above, teaches a casing that is removable via bolts (47), but fails to teach an eyebolt located on the top of the casing.

Keto discloses an apparatus that contains a removable fuse assembly from a casing.

Keto teaches an eyebolt (26) located at the top of the apparatus in order to facilitate separating the fuse assembly from the casing (col. 2 lines 51-53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the eyebolt of Keto to the top of the reaction apparatus of Christensen in order to facilitate the separation of the casing from the reaction apparatus.

8. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) as applied to claim 1 above, and further in view of Serratore et al. (US 3,278,633).

Regarding claims 4 and 5, Christensen, as discussed in claim 1 above, teaches heat exchange between the reactor and the surrounding gas (see flow direction of untreated, gas past reaction chamber) and between the gas flowing in the double piping into and out of the reaction apparatus (see flows 49 and 51). Christensen, however, fails to teach fins located in the reactor and between the inner and outer pipes.

Serratore discloses a reaction apparatus with heat exchange between the components in the reaction apparatus.

Serratore teaches fins attached to heat exchange surfaces in order to increase heat exchange efficiency (col. 3 line 74 – col. 4 line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the fins of Serratore to the reactor and the inner and outer pipes of Christensen in order to improve the heat exchange efficiency between process components.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) as applied to claim 6 above, and further in view of Nakamura et al. (US 3,814,171).

Regarding claim 7, Christensen, as discussed in claim 6 above, discloses a preference for decreasing the temperature of a converted exiting gas as much as possible in the interest of recovering the maximum amount of heat from the converted gas (col. 1 line 59 – col. 2 line 27). One way of doing this is to use excess heat from the converted gas to heat a boiler and produce steam (col. 1 line 59 – col. 2 line 27). Christensen, however, fails to teach a radiating plate on the outer tube (exiting tube) of the double piping.

Nakamura also discloses an apparatus for maximizing heat transfer between two streams.

Nakamura teaches adding radiating plates to the outer surface of heat transfer tubes in order to promote heat exchange efficiency (see claim 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the radiating plates of Nakamura, to the outer surface of the exiting gas tube of Christensen in order to promote heating exchange efficiency

between the exiting gas and a boiler to maximize energy recovery and produce steam from the boiler, as mentioned in Christensen.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151).

Regarding claim 8, the claimed orientation (horizontal) of the reaction apparatus does not distinguish the claimed invention over the prior art as changing the orientation of the apparatus would have been obvious to one of ordinary skill in the art to meet needs of installation space constraints. Furthermore, shifting the orientation of the apparatus does not change the operability of the apparatus and does not confer patentability (see MPEP §2144.04).

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151).

Regarding claim 11, Christensen discloses a preference for decreasing the temperature of a converted exiting gas as much as possible in the interest of recovering the maximum amount of heat from the converted gas (col. 1 line 59 – col. 2 line 27). Christensen, however, does not explicitly disclose the temperature difference between the incoming and exiting streams is less than 50°C.

It was well known in the art at the time of the invention that the minimization of temperature difference between the incoming and exiting streams was preferable to maximize energy efficiency, as is discussed by Christensen. Therefore, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the reaction apparatus operation variables to decrease temperature difference of the exiting and incoming streams to as little as possible (below 50°C) in order to maximize energy efficiency (In re Boesch, 617 F. 2d. 272,205 USPQ 215 (CCPA 1980)). Since it has been held that where general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Merkling whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MM

MJM

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